UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/753,087	01/02/2001	Edward B. Gindele	81807RLO	1337

7590 01/21/2005	EXAMINER
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ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 01/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _05 January 2005_.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _43-83_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _43-83_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _26 March 2004_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

DETAILED ACTION

Claim Objections

The numbering of claims is not in accordance with 37 CFR 1.126 which requires

the original numbering of the claims to be preserved throughout the prosecution. When

claims are canceled, the remaining claims must not be renumbered. When new claims

are presented, they must be numbered consecutively beginning with the number next

following the highest numbered claims previously presented (whether entered or not).

Misnumbered claims 1-41 been renumbered 43-83. Claims 1-41 were canceled

in the Amendment filed March 26th 2004.

Response to Amendment

Applicant's arguments filed January 5th, 2005 have been fully considered but they

are not persuasive. Applicant argues that the claims in their present form are in

condition for allowance. Examiner disagrees. See rejection below. Applicant canceled

original claims 1-41 and added new claim 42 in the first Amendment filed March 26th

2004. Claim 42 was rejected in Final Rejection filed November 11th 2004. Applicant

has now canceled new claim 42 and presented claims 1-41, which are duplicates of

original claims 1-41. Claims 1-41 have been renumbered as claims 43-83 and have

been rejected below in accordance with the rejection of original claims 1-41.

This rejection is therefore **MADE FINAL** under 37 CFR 1.129(a).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 43-46, and 52-55 are rejected under 35 U.S.C. 103(a) as being

unpatentable over the combination of U.S. Patent 5,509,086 to Edgar et al. and U.S.

Patent 5,959,720 to Kwon et al.

With regard to claim 43, Edgar discloses a method of enhancing a single digital

image affected by a noise source (abstract). The noise that the Edgar patent focuses

on is color crosstalk.

Edgar discloses step a) receiving a source digital image affected by a noise

source (abstract).

Edgar further discloses step b) using the pixels of the received source digital

image to calculate a noise characteristic value that relates to the noise present in the

received source digital image (column 7, lines 23-25). Here color cross talk is the noise

to be eliminated and color cross correlation is the noise characteristic value.

Edgar further discloses step c) using the noise characteristic value and the received source digital image to respectively calculate an enhanced digital image for the received source digital image (column 12, lines 12-15). Here the color cross correlations are the noise characteristic values and are used to determine correction coefficients and the coefficients are applied to the original source image scans to calculate an enhanced image.

Edgar does not disclose receiving and enhancing more than one digital image from a plurality of digital images. Edgar does not disclose the unique feature of using more than one image. Kwon discloses using scanned information from multiple images to determine how to best enhance the multiple images (column 1, lines 53-60). Here a filmstrip is scanned and the multiple individual frames are used to calculate and modify color. It is well known in the art to use multiple images in collecting image data in order to obtain more information as an advantage over examining a single image. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use multiple images as taught by Kwon in the method of noise extraction and correction of Edgar in order to obtain more information about the images and their noise characteristics and thus better enhance those images.

With regard to claim 44, Edgar discloses calculating the noise characteristic values as a function of the numerical values of the received source digital image pixels (column 8, lines 11-15). The color cross correlations are the noise characteristic values.

With regard to claim 45,Edgar discloses the source digital image to have pixels corresponding to different colors and step b) includes calculating the noise characteristic values as a function of the color of the received source digital image pixels (column 8, lines 11-15).

With regard to claim 46, Edgar discloses the source digital image to have pixels corresponding to different colors and step b) includes calculating the noise characteristic values as a function of the color and the numerical values of the received source digital image pixels (column 8, 11-15).

With regard to claim 52, Kwon discloses receiving the source digital images from a single image capture device including a digital camera, a photographic film scanner or print scanner (Fig.1, element 20). Kwon discloses using scanned information from multiple images from a filmstrip (column 1, lines 53-60).

With regard to claims 53 and 54, Kwon discloses the method wherein all of the received source digital images are derived from the same photographic film type (column 1, lines 53-60). Here it follows that if all of the images are taken from scanning a single filmstrip, that the images are derived from the same film type and the same consumer.

With regard to claim 55, the combination of Edgar and Kwon has already been applied to steps a) and b). With regard to step c), Edgar discloses storing the noise characteristic value with the received source digital images so that the noise characteristic value and the received source digital image can subsequently be used to generate one or more enhanced digital images (column 15, lines 10-16). Here the cross-correlation coefficients are used to populate a look-up table used to produce enhanced digital images. The received digital image would also be stored in memory since it was scanned and must be stored somewhere.

Claims 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patent 5,509,086 to Edgar et al. and U.S. Patent 5,959,720 to Kwon et al. as applied to claim 1 above, and further in view of U.S. Patent 5,923,775 to Snyder et al.

With regard to claim 47, Edgar and Kwon disclose the method of claim 43, but do not disclose the noise characteristic value as a function of the standard deviation of the noise present in the source digital images. Snyder discloses an apparatus and method for noise estimation and reduction in a digital image in which the noise characteristic is a function of the standard deviation of the noise present in the source digital image (column 2, lines 17-21). It is well known to use the standard deviation of a set of data as a threshold for inclusion. When measuring pixel values to determine if

noise is present it is a common practice to use the standard deviation as a delimiting factor. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to calculate noise or any other outlying statistical value as a function of standard deviation in order to calculate a threshold for inclusion in a set of data.

With regard to claim 48, Edgar and Kwon disclose the method of claim 43. Edgar further discloses the method wherein step b) includes: using a residual spatial filter to calculate a residual digital image for each received source digital image (column 2, lines 35-40). Here the image is divided into different spectral or color bands. Edgar does not disclose using the pixel values of the residual digital images to generate a residual histogram and using the residual histogram to calculate the noise characteristic value. Snyder discloses separating the original image into several residual images and then calculating histograms for each of the residual images (column 2, lines 1-12). It is well known in the art to use histograms to measure and quantize data for better manipulation. A histogram is known to be especially helpful in plotting frequencies of occurring values in a data set such as a color distribution. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use histograms as taught by Snyder to plot data gathered by the method of Edgar and Kwon in order to better manipulate that data.

With regard to claim 49, Snyder discloses the use of histograms for code value

separated images, meaning his residual images have been separated according to the

code values of the individual pixels (column 2, lines 1-12). Snyder does not expressly

say that the code values are related to color. Edgar discloses the separation of the

image into specific color residual images. So it follows that the combination of Edgar

and Snyder made in claim 6, includes the step of generating the residual histograms as

a function of the color and the numerical values of the received source digital image

pixels and calculating the corresponding noise characteristic values as a function of the

color and the numerical values of the received source digital image pixels.

Claims 50 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable

over the combination of U.S. Patent 5,509,086 to Edgar et al. and U.S. Patent

5,959,720 to Kwon et al. as applied to claim 43 above, and further in view of U.S. Patent

5,956,432 to Ohta.

With regard to claim 50, Edgar and Kwon disclose the method of claim 43. They

do not disclose using an adaptive spatial filter responsive to the noise characteristic

value to calculate the enhanced digital images. Ohta discloses using an adaptive

spatial filter responsive to the noise characteristic value to calculate the enhanced

digital image (column 4, lines 45-50 and Fig. 5, elements 501 and 502). Here Ohta

discloses applying a spatial filter to sharpen the image and the sharpening is performed

according to the correlation coefficient, which determined the noise characteristics of

the image. It is well known to use filters to enhance digital images. Therefore it would have been obvious to one of ordinary skill in the art to use a filter to enhance the image according to the noise characteristic of Edgar as taught by Ohta.

With regard to claim 51, Ohta discloses a spatial sharpening filter used to reduce noise (column 4, lines 45-50 and Fig. 5, elements 501 and 502).

Claims 56-66 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patent 5,509,086 to Edgar et al. and U.S. Patent 5,959,720 to Kwon et al. and further in view of U.S. Patent 5,923,775 to Snyder.

With regard to claim 56, the combination of Edgar and Kwon has already been applied to step a) as discussed with regard to claim 43. With regard to step b), Edgar discloses receiving a source type identification tag corresponding to the received source digital images (column 15, lines 10-16 and 60-63). Here Edgar refers to using different models for different film types and in order to distinguish between types of film it is necessary to have some sort of tag or way to identify the film type or source type.

With regard to step c), Edgar discloses using the source type identification tag to select an appropriate default noise characteristic value from a plurality of stored default noise characteristic values (column 15, lines 10-16 and 60-63). Edgar discloses using the different models for different film types. The models would inherently make use of different noise characteristics for the different types of film and the different types of film would have to be identified by a tag of some sort.

With regard to step d) Edgar discloses calculating noise characteristics or color cross correlations locally. The noise characteristics are also compensated or weighted depending on the level of detail in an area of the image (column 2, lines 55-60).

With regard to step e) Edgar does not disclose combining the default noise characteristic with the local noise characteristic to calculate the updated noise characteristic. Snyder discloses calculating default noise characteristics (column 2, lines 19-22). The standard deviation is used as the initial default noise characteristic. Then neighborhoods of pixels are used to calculate local noise characteristics (column 2, lines 23-26) and finally all of the noise estimates local and default, are combined to create an updated noise characteristic and noise reduced image. It is well known in the art that to achieve a more accurate calculation, it is necessary to perform estimations repeatedly. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use the noise removal system of Edgar with noise estimation and calculation as taught by Snyder in order to better calculate an updated noise characteristic value.

With regard to claims 57-59, the discussions of claims 44-46 apply.

With regard to claims 60-62, the discussions of claims 47-49 apply.

With regard to claims 63-65, the discussions of claims 52-54 apply. Claims 52-54 do not discuss the use of identification tags, but such tags are inherent in determining the film type or image type.

With regard to claim 66, Snyder discloses using the updated noise characteristic value to enhance one or more of the received source digital images (column 2, lines 33-35).

With regard to claim 69, Snyder discloses calculating the updated noise characteristic from a linear combination of the local noise characteristic and the default noise characteristic value (column 5, lines 33-37). Here Snyder discloses the use of a linear operation for calculating additional signal noise estimates. It follows that the default noise characteristic and the local noise characteristic are combined linearly.

Claims 67 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of U.S. Patent 5,509,086 to Edgar et al. and U.S. Patent 5,959,720 to Kwon et al. and U.S. Patent 5,923,775 to Snyder as applied to claim 24 above and in further view of U.S. Patent 9,956,432 to Ohta.

With regard to claim 67, Edgar, Kwon, and Snyder disclose the method of claim 56. They do not disclose using an adaptive spatial filter responsive to the noise characteristic value to calculate the enhanced digital images. Ohta discloses using an adaptive spatial filter responsive to the noise characteristic value to calculate the enhanced digital image (column 4, lines 45-50 and Fig. 5, elements 501 and 502). Here Ohta discloses applying a spatial filter to sharpen the image and the sharpening is performed according to the correlation coefficient, which determined the noise characteristics of the image. It is well known to use filters to enhance digital images.

Therefore it would have been obvious to one of ordinary skill in the art to use a filter to enhance the image according to the noise characteristic of Edgar as taught by Ohta.

With regard to claim 68, Ohta discloses a spatial sharpening filter used to reduce noise (column 4, lines 45-50 and Fig. 5, elements 501 and 502).

With regard to claim 70, the combination of Edgar, Kwon, and Snyder has already been applied to steps a) and b). With regard to step c) Snyder discloses the use of stored default residual histograms (column 3, lines 63-67). These gradient threshold histograms are already in place for use in calculating improved histograms once the residual local histograms are calculated. It follows that the tag identification used to choose between types of film as disclosed in Edgar (column 15, lines 10-16 and 60-63) would be used to select a histogram from multiple stored histograms.

With regard to step d) Snyder discloses using the pixels received source digital images to calculate a local residual histogram (column 3, lines 45-60 and Fig.2, elements 200-220).

With regard to step e) Snyder further discloses combining the selected default residual histogram and the local residual histogram to generate an updated residual histogram (column 4, lines 10-14). Here the default gradient histograms are used to smooth the local residual histograms to create a plurality of updated smoothed histograms.

With regard to step f) Snyder discloses using the updated residual histogram to calculate the noise characteristic value (column 2, lines 1-12). Snyder calculates the noise characteristic value differently than Edgar since histograms are used. The histograms are used in determining thresholds, which effectively determine what is noise and what is not, so the thresholds are effectively noise characteristic values. It is well known in the art to use histograms to measure and quantize data for better manipulation. A histogram is known to be especially helpful in plotting frequencies of occurring values in a data set such as a color distribution. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use histograms as taught by Snyder to plot data gathered by the method of Edgar and Kwon in order to better manipulate that data.

With regard to claim 71, Snyder discloses the method wherein step d) includes calculating the local residual histograms as a function of the numerical values of the received source digital image pixels and wherein step f) includes calculating the noise characteristic values as a function of the numerical values of the received source digital image pixels from the corresponding updated residual histogram (column 2, lines 1-12). Here pixels are scanned and according to their code values they are split into residual images. Using the pixel values and the corresponding enhanced histograms the threshold noise characteristic values are calculated.

With regard to claim 72, Edgar discloses the method wherein the received source

digital images have pixels corresponding to different colors. Snyder discloses the

wherein step d) includes the step of calculating the local residual histograms as a

function of the code value of the received source digital image pixels and step f)

includes calculating the noise characteristic values as a function of the code value of the

received source digital image pixels from the corresponding updated residual histogram

(column 2, lines 1-12). In the combination of Edgar and Snyder it would be obvious to

use the histograms and code values for the pixels of Snyder to correspond to the color

values of Edgar.

With regard to claim 73, the discussion of claim 30 applies. The histograms used

by Snyder would have to be determined as a function of both color and numerical

values as used by Edgar.

With regard to claim 74, the discussion of claim 5 applies.

With regard to claim 75, Edgar discloses the method wherein step b) includes:

using a residual spatial filter to calculate a residual digital image for each received

source digital image (column 2, lines 35-40). Here the image is divided into different

spectral or color bands. Snyder discloses separating the original image into several

residual images and then calculating histograms for each of the residual images

(column 2, lines 1-12).

With regard to claim 76, Edgar discloses using the noise characteristic value to

enhance the received digital image (column 3, lines 1-4). The noise characteristic is the

color crosstalk and the goal is to remove that noise and thus enhance the image.

With regard to claim 79, Snyder discloses calculating the updated noise

characteristic from a linear combination of the local noise characteristic and the default

noise characteristic value (column 5, lines 33-37). Here Snyder discloses the use of a

linear operation for calculating additional signal noise estimates. It follows that the

default noise characteristic and the local noise characteristic are combined linearly.

Claims 77 and 78 are rejected under 35 U.S.C. 103(a) as being unpatentable

over the combination of U.S. Patent 5,509,086 to Edgar et al. and U.S. Patent

5,959,720 to Kwon et al. and U.S. Patent 5,923,775 to Snyder as applied to claims 28-

34 above and in further view of U.S. Patent 9,956,432 to Ohta.

With regard to claim 78, Edgar, Kwon, and Snyder disclose the method of claim

70. They do not disclose using an adaptive spatial filter responsive to the noise

characteristic value to enhance one or more of the received source digital images. Ohta

discloses using an adaptive spatial filter responsive to the noise characteristic value to

enhance a digital image (column 4, lines 45-50 and Fig. 5, elements 501 and 502).

Here Ohta discloses applying a spatial filter to sharpen the image and the sharpening is

performed according to the correlation coefficient, which determined the noise characteristics of the image. It is well known to use filters to enhance digital images. Therefore it would have been obvious to one of ordinary skill in the art to use a filter to enhance the image according to the noise characteristic of Edgar as taught by Ohta.

With regard to claim 78, Ohta discloses a spatial sharpening filter used to reduce noise (column 4, lines 45-50 and Fig. 5, elements 501 and 502).

With regard to claims 80-83, Kwon, Edgar, and Snyder all disclose computer-based methods, which inherently contain a storage medium and instructions for performing the functions of the invention.

Conclusion

All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.129(a) and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.129(a). Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the submission under 37 CFR 1.129(a). See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Wes Tucker whose telephone number is 703-305-6700.

The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Amelia Au can be reached on (703)308-6604. The fax phone number for

the organization where this application or proceeding is assigned is 703-872-9306.
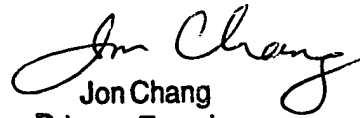
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Wes Tucker

1-13-04

Jon Chang
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